FOREWORD

It gives me considerable pleasure to write a foreword to this book by a colleague who has given me much assistance, as we have together made a mathematical attack on some rather difficult engineering problems.

Progressive development in electrical engineering has been rapid, partly because many of the problems encountered have been such as to yield to mathematical analysis. This has made accurate prediction of the behaviour of electric circuits possible. As electrical engineering develops, circuits become more complicated and the growing importance of transient effects makes problems harder to solve. It is evident, therefore, that the electrical engineer must learn to use more powerful mathematical tools. One of the most useful for the analysis of electric circuits is the Heaviside Operational Calculus. This is, in effect, a simple shorthand technique for evaluating the results of Fourier integral analysis.

This Monograph was prepared at the suggestion of Professor Willis Jackson, D.Sc., D.Phil., M.I.E.E., of Manchester University, with the needs of electrical engineering students in mind. It is based on an 'Out-of-Hours' course of lectures delivered by Mr. Josephs to engineers at the Post Office Research Station. The scheme adopted in the original lectures and closely followed in this book is to base electric circuit theory on a far-reaching theorem which, so far, appears to have escaped the notice of engineers. This theorem has been re-constructed from the scattered papers of Heaviside and is probably the last he ever

deduced; for this reason the author has called it 'Heaviside's Last Theorem'. The famous Carson integral equation may be obtained as a corollary to this theorem. It also leads to many others involving Fourier and Bessel integrals, elliptic functions, &c., which have a wider field of application than electric circuits.

It is hoped that this little book will be of service in preparing the ground for a greater use of Heaviside's Operational Calculus and that it will lead to a fuller and more just appreciation of the great work done by Heaviside in connexion with the foundations of electric circuit theory.

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